

Amendments to the Drawings:

Sheet 13 of 18 has been amended.

The amendment to Figure 12D on sheet 13 of 18 involves replacing the expression "Step 420" with the expression "Step 430".

REMARKS

Status of Claims

Claims 1, 2, 5, 11, 12, 14-18, 21-27, 36 and 37 remain in the application.

Applicant gratefully acknowledges the allowance of claims 1, 2, 5, 36 and 37.

The Examiner has objected to claims 15, 23 and 27, but stated that these claims would be allowable if rewritten in independent form, including all the intervening limitations. Claims 15, 23 and 27 have been rewritten in independent form, and otherwise incorporate only minor clarifying amendments as described below.

Amendments to the Claims

The claims, including allowed claims 1 and 5, have been amended for clarity and consistency with regard to the use of the terms "substrate", "optical medium" and "optical waveguide". This amendment is to clarify that each of these terms effectively pertain to the same feature, now being recited as an "optical substrate". Examples of the optical substrate are the Eschelle grating 240 in Figure 6 or optical waveguide 395 in Figure 12A-12G. Although Figures 6 and 12A-12G are shown from a view that is perpendicular to the plane of the optical waveguide layer, which is a layer of higher refractive index than those surrounding the optical waveguide layer, an optical waveguide is known to include layers having a lower index of refraction than the waveguide layer. An optical waveguide of this type is described in the present application at least at page 10, lines 13-31 and illustrated in Figure 1A.

Allowed claim 1 has been amended to recite "A diffraction grating comprising a plurality of grooves formed in [a] an

optical substrate", where newly added text is underlined and deleted text is in square brackets.

Allowed claim 5 has been amended to recite "A diffraction grating according to claim 1 wherein the optical substrate comprises [an optical planar waveguide which consists of] at least one layer ...".

Claim 11 has been amended to be dependent upon claim 1, and the expression "an optical medium" has been replaced with "the optical substrate".

Claim 12 has been amended to be dependent upon claim 1.

Claim 14 depends from claim 11, which now depends from claim 1. So redundant reference to the elements incorporated by dependency have been deleted from claim 14. "Groove-filling" has been added to claim 14 for clarity, with support for this term available, for example, in paragraph [0081] and claim 16 of the published application 2006/0119945. Claim 18 has been amended in a similar manner. Claim 15 has been amended in a similar manner with respect to the "groove-filling" clarification.

In newly rewritten independent claims 15 and 27, the expression "the substrate" has been replaced with "the optical substrate" and the expression "an optical waveguide which consists of" has been deleted.

Claim 16, 17, 24 and 25 have been amended by replacing the expression "the optical waveguide" with "the optical substrate". Claim 16 has been further amended to be dependent upon claim 15 and to recite "the respective layers of the optical substrate".

Claim 24 has been amended to recite "[[A]] The diffraction grating according to claim 18 wherein the optical substrate comprises at least one layer of high refractive index surrounded

by media of lower refractive index".

All the dependent claims have been amended by replacing the expression "A diffraction grating" with "The diffraction grating".

It is respectfully submitted that the claim amendments are of a minor nature and are intended solely to clarify the claims.

These amendments should not affect the allowance of claims 1, 2, 5, 36, and 37 or the allowability of rewritten claims 15, 23, and 27.

Amendments to the Drawings

Figure 12D on sheet 13 of 18 has been amended by replacing the expression "Step 420" with the expression "Step 430". Support for this correction is in paragraph [0081] of the published application: "At Step 430 (FIG. 12D), the photoresist"

Drawings

The Examiner has objected to the drawings under 37 CFR 1.83(a). It is alleged that the drawings do not show all the features recited in claims 5, 14, 15 and 27.

Based on amendments made to the claims, as discussed in detail above, Applicants submit that all the features of the amended claims are shown in the drawings.

Looking at claim 14 in particular, the claim no longer recites "an optical medium comprising a plurality of grooves in a substrate". The claim is indirectly dependent upon claim 1, via claim 11. As the Examiner has not made a similar objection to claim 1, it is believed that all features of claim 1 are shown in the drawings. Claim 11 recites the further limitation that the

reflective facets are embedded within the optical substrate, which is illustrated in Figures 12A-12G. The only features in claim 14 that are not included in claims 1 and 11 are the spaces adjoining the facets and sidewalls, which are the regions indicated by reference character 280 in Figure 6 of the present application.

With regard to claims 5, 15 and 27, Applicants submit that some embodiments of the invention include an optical substrate having multiple layers as recited in these claims, as illustrated by layers 20 and 30 in Figure 1A. Applicants further submit that one skilled in the art would recognize that having the reflective facets perpendicular to the plane of the substrate allows incident light that is reflected off of the reflective facets to be maintained in the same plane as the incident light, and therefore be maintained within a layer of higher refractive index of the optical substrate. Applicants submit that all the features in claims 5, 15 and 27 are shown in the drawings.

Claim Objections

The Examiner has objected to claims 16, 17, 24 and 25 because the expression "the optical waveguide" lacks antecedent basis in the proceeding claims. As described above, the expression "the optical waveguide" has been cancelled from these claims, rendering the objection moot.

35 U.S.C 102 Claim Rejections

Controlling case law has frequently addressed rejections under 35 USC § 102. "For a prior art reference to anticipate in terms of 35 USC Section 102, every element of the claimed invention must be identically shown in a single reference." *Diversitech Corp. v. Century Steps, Inc.*, 850 F2d 675, 677, 7 USPQ2d 1315, 1317 (Fed. Cir. 1988; emphasis added). The

disclosed elements must be arranged as in the claim under review.

See *Lindemann Machinefabrik v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984). If any claim, element, or step is absent from the reference that is being relied upon, there is no anticipation. *Kloster Speedsteel AB v. Crucible, Inc.*, 793 F.2d 1565, 230 USPQ 81 (Fed. Cir. 1986; emphasis added). The following analysis of the present rejections is respectfully offered with guidance from the foregoing controlling case law decisions.

The Examiner has rejected claims 11, 12, 14, 18, 21, 22 and 24-26 under 35 USC 102(e) as being unpatentable over U.S. Patent No. 6,859,317 (Cappiello et al.).

Amended claims 11, 12 and 18 are now dependent upon allowed claim 1. Claim 14 is dependent upon claim 11. Claims 21, 22 and 24-26 are dependent upon claim 18.

As claim 1 is indicated to be allowed by the Examiner, Applicants submit that amended claims 11, 12, 14, 18, 21, 22 and 24-26, in view of their dependence upon claim 1, are likewise allowable.

The Examiner has rejected claims 11, 12, 14, 16 and 17 under 35 USC 102(e) as being unpatentable over U.S. Patent No. 6,822,796 (Takada et al.).

As noted above, amended claims 11 and 12 are now dependent upon allowed claim 1, and claim 14 is dependent upon claim 11. Claim 17 is dependent upon claim 14.

As claim 1 is indicated to be allowed by the Examiner, Applicants submit that amended claims 11, 12, 14 and 17, in view of their dependence upon allowed claim 1, are likewise allowable.

Claim 16 is dependent upon claim 15, which has been

rewritten in independent form.

As claim 15 is indicated to be allowed by the Examiner in its amended form, Applicants submit that amended claim 16, in view of its dependence upon claim 15, is likewise allowable.

CONCLUSION

In view of the foregoing, early favorable consideration of this application is earnestly solicited.

Respectfully submitted,

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